The author is interesting on the folk-lore of war and the signification of soldiers' songs. These he must admit are for the most part crude and childish, but possess the merit of dispelling sadness and relieving psychic tension, and tend to elevate the patriotic spirit. He quotes figures to prove that the infantry invariably bear the brunt of the battle and most truly are the representatives of their nation. When it comes to the final assault they are the principal factor in victory. Each nation has its own innate characteristics, and therefore each army its own methods of fighting, so that the slavish imitation of another nation's methods should be severely deprecated. The feats accomplished by the infantry are due to strict laws and to the correlation between the nation and the army; thus a people in possession of good infantry can achieve a durable success, and this can be established only on a love of national independence. Modern war, therefore, has accentuated and not diminished the importance of individuality in battle. The ultimate argument in war is not the cannon, but the man.

In the last few pages of the book the author gives a short though useful account of the effects of war upon the soldier's nervous system. His conclusion is that "war insanity" in the strict sense is either non-existent or extremely rare. War simply brings into evidence, in those individuals already predisposed, the classical symptoms of the various insanities with which we are familiar in civil life. This opinion is now universally accepted.

The author has devoted most study in this direction to the psychoneuroses caused by profound emotion—for example, "shell shock"—and emphasises their similarity with those found to occur after earthquakes and other disasters. Violent emotion tends to produce fear, which in a normal person may be unaccompanied by a morbid mental disturbance. In the predisposed, however, the violent emotion of fear determines symptoms of "shock," some elements of which are fixed for a longer or shorter time by auto-suggestion. The author does not accept the view that emotional and "shock" symptoms are separable.

The book is an extremely able study and well worthy of perusal. One cannot, however, avoid criticising the unusually close spacing. This, possibly, is due to measures of economy.

OZONE AS A HYGIENIC AGENT.

Ozone: Its Manufacture, Properties, and Uses. By Dr. A. Vosmaer. Pp xii + 197. (London: Constable and Co., Ltd., 1916.) Price 10*s.* 6*d.* net.

In comparatively recent years the production of ozone, or rather of air containing a small percentage of ozone, on an industrial scale has reached a considerable degree of development, chiefly on account of its application to the sterilisation of drinking water. In a less degree ozonised air has been applied to the deodorisation of the air of public buildings, underground railways, etc. These technical developments are associated mainly with the names of the Siemens and Halske, Abraham-Marmier, Otto, and General Electric Companies.

As regards European works employing ozonised air for the purification of drinking water, Dr. Vosmaer gives a list of forty-nine installations, treating *in summo* nearly eighty-five million gallons of water per day of twenty-four hours. Of these the largest are at Paris, Petrograd, Nice, Villefranche, Lunéville, Lorient, Florence, Chartres, Saint-Servan, Laval, Compiègne, Constanza, and Wiesbaden.

Parts i. and ii. of the present work deal with the chemistry of ozone, the electrical discharge in gases, the different types of technical ozonisers and their output and efficiency. Part iii. is concerned with the uses of ozone, and part iv. contains a list of American patents bearing on ozone and a bibliography of papers and books.

Although it is undeniable that the book contains a good deal of useful information, and is written by an author practically familiar with the subject, it must be admitted that its scientific *niveau* is not high. Even when we come to the more technical part, where the author is obviously more at home, there is very little of that thorough quantitative information which is requisite for the scientific designer of plant. A number of diagrams, photographs of plant, and curves are given, but the treatment of the subject is distinctly sketchy and superficial, and does not convey the impression that the author possesses a real scientific knowledge of the chemical, electrical, and engineering principles relating to his subject. Viewed, however, as a semi-technical, semi-popular account of the manufacture and uses of ozone (which is, perhaps, all that the author intended it to be), the book is certainly interesting, and will, no doubt, be of use to readers unacquainted with the subject.

F. G. Donnan.

OUR BOOKSHELF.

Cellulose: An Outline of the Chemistry of the Structural Elements of Plants with Reference to their Natural History and Industrial Uses. By Cross and Bevan. New impression, with Supplement. Pp. xviii + 348. (London: Longmans, Green, and Co., 1918.) Price 14*s.* net.

This well-known monograph by authors actively engaged in original investigation on many matters connected with the cellulose group is written in a manner stimulating to all workers in this field. The new impression is chiefly remarkable for a supplementary chapter of twenty pages, the greater portion of which is composed of the authors' critical review of researches published by others during the last two or three years. In addition there is a very interesting *résumé* of the authors' views on the standard of purity for "pure cellulose" and of their attempts to define a "normal cellulose." Whilst they regard cotton cellulose as the prototype of the group, it is affirmed, in contradistinction to the descriptions

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common in the older text-books of cellulose as a very stable substance, (1) that cellulose is constitutionally modified by any and every treatment with reagents, and (2) that profound changes affecting the reactivity of its individual groups are determined by treatments which are not marked by change of weight of the cellulose or by visible structural modifications.

It thus follows that surgical cotton-wool or chemical filter-papers, for example, which are often considered as "pure cellulose" and the criteria of purity adopted by various manufacturers, are selected on an empirical basis, and the authors, therefore, attempt to define the "normal standard." Their definition of this as cotton purified from its raw condition by such treatments as attack and remove its non-cellulosic components with the ascertained minimum of action upon the cellulose itself obviously raises difficulties in the verification of the so-called "standard" product. Their conclusions are most valuable as a stimulus to further research, and their statement that "every process of treating the vegetable fibres in the arts produces some constitutional change" shows how necessary is systematic research work organised on a co-operative basis for the continued well-being of all the textile and paper-making trades.

ROBERT H. PICKARD.

The Year-Book of the Scientific and Learned Societies of Great Britain and Ireland. Compiled from official sources. Pp. viii + 334. (London: Charles Griffin and Co., Ltd., 1917.) Price 9*s*.

THE thirty-fourth annual issue of this useful work of reference provides a convenient record of the work done in science, literature, and art during the year 1916–17. Not only are the activities of the scientific societies chronicled, but an account is provided also of the researches carried out by the Meteorological Office, the National Physical Laboratory, the Royal Observatory at Greenwich, the Geological Survey, Kew Gardens, Rothamsted Experimental Station, and similar organisations of a national character.

The volume is very comprehensive in scope, but in the science sections we miss references to the Society of Glass Technology and to the Illuminating Engineering Society, both of which are active and important.

LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. *No notice is taken of anonymous communications.]*

Cotton-growing Statistics.

THE article on the above subject in NATURE of April 11 was welcome to me as directing attention to very important economic possibilities which lie behind the making of precise reports and reasoned forecasts concerning the state of all crops, by means of the Plant-Development-Curve method which I devised during my service in Egypt. With your permission, however, I would like to point out that the writer of the article was under a misapprehension in thinking that the recent Egyptian data he mentioned were adverse to this new method.

Although it is true that the paper cited from the *Agricultural Journal of Egypt* (vol. vii.) states that "the object of (1) was to study the life-history of the various types of cotton in the different parts of the country and to ascertain whether it was possible to estimate the yield of the crop several weeks before the cotton was ready for picking," yet the absence of further comment is obviously due merely to a certain looseness of structure in the paper in question, whereby a summary of results obtained under the stated purpose of this section "(1)" is given somewhat irrelevantly as follows on p. 52:—"The above observations seem to point to the fact that watering experiments on the cotton crop are most necessary; for if the flowering curve could be maintained (*sic*) during the whole of July instead of dropping considerably in the middle of the month, there should be a considerable increase in the yield of the crop."

Any decision as to the real result of this section of the paper in its declared object must therefore be taken from the data themselves, which are published in the form of plant-development curves.

So far as the prediction of bolling from flowering is concerned, with a seven-week interval between, the satisfactory nature of the results may be seen at a glance by those who care to consult the paper in question (although each curve represents the behaviour of only a single observation row of only fifty plants, instead of being the mean of at least five such rows of one hundred plants). In thus comparing the flowering and bolling curves, the reader should discard the first weekly ordinate in every bolling curve as there published, since the counting of the bolls was not started soon enough, and this ordinate, therefore, includes earlier bolls from the second, and even the third, antecedent week, which naturally spoils the similarity. On placing the curves in superposition with a seven-week shift, these new data (*e.g.* Fig. 9 and Fig. 11) then illustrate most satisfactorily the points which I have discussed in detail in "Analyses of Agricultural Yield" (Phil. Trans. Roy. Soc., B. 327, 333, 352), and specially demonstrated by Fig. 17 in part iii. of the "Analyses," such as the incidence of hot days, waterings, and boll-worm in affecting the shedding.

As regards the forecasting of the flowering itself by the growth-curve, the data under discussion have no significance. The daily fluctuation of flowering of cotton in Egypt is not predicted by main-stem growth measurements made later than June 1 (see Fig. 10 in my "Development and Properties of Raw Cotton"), owing to the four weeks' duration of this predetermination period, and to other causes which I discussed on p. 182 *et ante* of part iii. of the "Analyses." Since the growth-curves in vol. vii. of the *Agricultural Journal of Egypt* only began on May 28, they are effectively not for this purpose growth-curves at all. In any case, the growth should be measured daily, and not merely once a fortnight.

W. LAWRENCE BALLS.

St. James's Square, Manchester, April 16.

DR. BALLS's comments on the short article on "Cotton-growing Statistics" in the issue of NATURE for April 11 opens up a wide and interesting feature in scientific research, viz. the value of observed data and their interpretation.

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